

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF CLAIMS:

1-112. (cancelled)

113. (currently amended) A stable, homogeneous composition comprising:

an ionic liquid of formula  $A_1^+X_1^-$  ~~with a first part providing~~ comprising (i) a liquid matrix of  $A_1^+$  and/or  $X_1^-$  ionic entities linked to one or more initial functions  $F_0$  and ~~a second part providing~~ (ii) a functionalized salt  $A_1^+X_1^-$  as a soluble reaction support, the liquid matrix and functionalized salt forming a homogeneous phase, wherein,

the functionalized salt is recyclable,

in the functionalized salt, ~~converts~~ the one or more initial functions  $F_0$  are converted into first novel functions of the ~~second part~~ functionalized salt of the ionic liquid, and,

the first novel functions of the ~~second part~~ functionalized salt of the ionic liquid are capable of being subsequently converted to other functions, without affecting the initial function or functions  $F_0$  of the ~~first part~~ liquid matrix of the ionic liquid.

114. (currently amended) A stable, homogeneous composition comprising, in solution:

an ionic liquid of formula  $A_1^+X_1^-$  providing a liquid matrix; and

one functionalized salt of formula  $A_2^+X_2^-$  providing a soluble reaction support, ~~to allow (i) catching of one or more molecules, (ii) functionalizing said molecules, and (iii) releasing of functionalized molecules after a reaction sequence, said functionalized salt being recyclable,~~  
said functionalized salt carrying one or more functions that allows the catching of molecules, functionalization of said molecules, and release of said functionalized molecules after a reaction sequence, and

said functionalized salt being dissolved in the liquid matrix so that the composition forms a homogeneous phase, wherein,

$A_1^+$  is a non-functional cation or a mixture of cations in which none of the cations is functional,

$X_1^-$  is a non-functional anion or a mixture of anions in which none of the anions is functional,

$A_2^+$  is selected from the group consisting of a functional cation, non-functional cation, a mixture of cations in

which none of the cations is functional, and a mixture of cations in which at least one cation is functional,

$X_2^-$  is selected from the group consisting of a functional anion, a non-functional anion, a mixture of anions in which none of the anions is functional, and a mixture of anions in which at least one anion is functional, at least one of  $A_2^+$  and  $X_2^-$  is a functional ion,

said functional cation is of a formula  $Y^+-L-F_i$  and said functional anion is of a formula  $Y^--(L)_k-F_i$ ,

$Y^+$ - and  $Y^-$ - are ionic entities that carry the charge of the cation and the charge of the anion, respectively, linked via  $[[an]]$  a linker L to at least one function  $F_i$ ,

L is an alkyl group of 1 to 20 carbon atoms,

$F_i$  varies from  $F_0$  to  $F_n$ , n being an integer varying from 1 to 10, with  $F_0$  being a function initially linked to said cationic entities and anionic entities and  $F_1$  to  $F_{10}$  being functions converted from said  $F_0$  after sequential and subsequent reactions with said cationic or anionic entities,

said function  $F_i$  is selected from the group consisting of hydroxyl, carboxylic, amide, sulphone, primary amine, secondary amine, aldehyde, ketone, ethenyl, ethynyl, dienyl, ether, epoxide, primary phosphine, secondary phosphine, tertiary phosphine, azide, imine, ketene, cumulene, heterocumulene, thiol, thioether, sulphoxide, phosphorus-containing moieties,

heterocycles, sulphonic acid, silane, stannane and functional aryl functions,

k is equal to 0 or 1, and

R is an alkyl group of 1 to 20 carbon atoms or an aryl group of 6 to 30 carbon atoms.

115. (previously presented) The composition of claim 114, wherein the

$A_2^+$  cation and/or the  $X_2^-$  anion of the functionalized salt or salts, corresponding to a  $Y^-$  ionic entity linked to at least one function  $F_i$ , are immobilized in the liquid matrix and cannot be extracted from the liquid matrix by solvent extraction.

116. (previously presented) The composition of claim 114, wherein, the liquid matrix is non-reactive vis-à-vis the functionalized salt.

117. (previously presented) The composition of claim 114, wherein  $A_2^+$  is a functional cation.

118. (previously presented) The composition of claim 117, wherein the  $X_1^-$  and  $X_2^-$  anions are identical.

119. (previously presented) The composition of claim 117, wherein,

the  $A_1^+$  and  $A_2^+$  cations are onium cations selected from the group consisting of substituted or non-substituted pyridinium, imidazolium, ammonium, phosphonium or sulphonium cations, and

the  $X_1^-$  and  $X_2^-$  anions are selected from the group consisting of non-complex anions and complex anions,

non-complex anions being selected from the group consisting of:  $BF_4^-$ ,  $PF_6^-$ ,  $CF_3SO_3^-$ ,  $CH_3COO^-$ ,  $CF_3CO_2^-$ ,  $N(SO_2CF_3)_2$ , halides,  $BR_4^-$ ,  $RCO_2^-$  and  $RSO_3^-$  with R selected from the group consisting of an alkyl group of 1 to 20 carbon atoms, an aryl group of 6 to 30 carbon atoms, a perfluorinated group and partially fluorinated group, and  $R'SO_4^-$  anions with R' selected from the group consisting of a hydrogen atom, a methyl group and an ethyl group, and

complex anions resulting from the combination of a Lewis acid and a halide X, said complex anion being of general formula  $MX_j$  with j being an integer between 1 and 7, and M representing a metal selected from the group consisting of aluminum, tin, zinc, bismuth, manganese, iron, copper, molybdenum, antimony, gallium or indium.

120. (previously presented) The composition of claim 114, wherein,

the  $Y^+$ - cationic entity carries the positive charge of the cation and is linked via an linker L to a function  $F_0$ ,

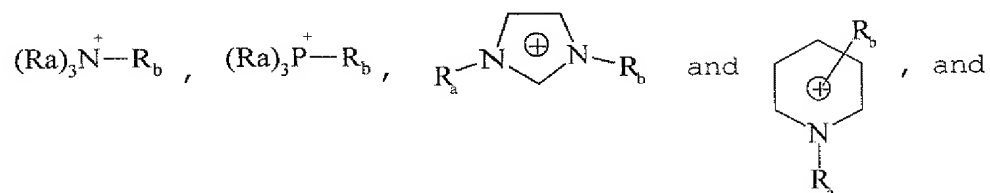
L is an alkyl group comprising 1 to 20 carbon atoms, and,

function  $F_0$  is selected from the group consisting of hydroxyl, carboxylic, amide, sulphone, primary amine, secondary amine, aldehyde, ketone, ethenyl, ethynyl, dienyl, ether, epoxide, phosphine (primary, secondary or tertiary), azide, imine, ketene, cumulene, heterocumulene, thiol, thioether, sulphoxide, phosphorus-containing moieties, heterocycles, sulphonic acid, silane, stannane and functional aryl functions.

121. (previously presented) The composition of claim 114, wherein,

$X_1^-$  is selected from the group consisting of:  $NTf_2^-$ ,  $PF_6^-$ ,  $BF_4^-$  and  $CF_3SO_3^-$ ,

$A_1^+$  is selected from the group consisting of:



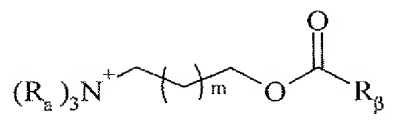
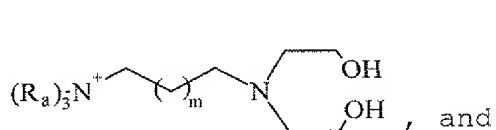
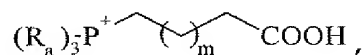
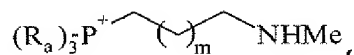
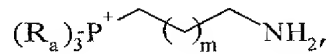
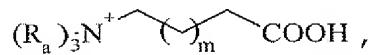
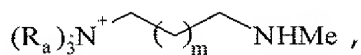
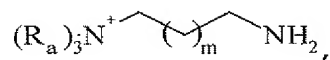
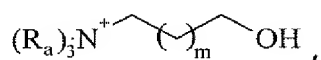
$R_a$  and  $R_b$  are linear or branched alkyl groups of 1 to

20 carbon atoms, functional alkyl groups of 1 to 20 carbon atoms, or functional or non-functional aryl groups of 6 to 30 carbon atoms.

122. (previously presented) The composition of claim 114, wherein

$X_2^-$  is selected from the group consisting of:  $NTf_2^-$ ,  $PF_6^-$ ,  $BF_4^-$ ,  $Cl^-$ ,  $Br^-$ ,  $I^-$ ,  $CF_3SO_3^-$ ,  $MeSO_4^-$ ,  $EtSO_4^-$ ,  $MeSO_3^-$ ,  $C_6H_5SO_3^-$ , and  $pMeC_6H_4SO_3^-$ ,

$A_2^+$  is selected from the group consisting of:



m is an integer comprised between 0 and 20,

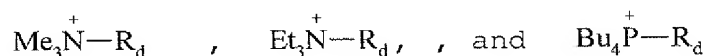
$R_\beta$  is selected from the group consisting of a

substituted or non-substituted vinyl group, a functional aryl group of 1 to 20 carbon atoms, and a functional alkyl group of 6 to 30 carbon atoms, and

$R_a$  is a branched or non-branched alkyl group of 1 to 20 carbon atoms.

123. (previously presented) The composition of claim 114, wherein,

$A_2^+$  is selected from the group consisting of



$R_d$  is an alkyl group comprising 1 to 20 carbon atoms,

$X_2^-$  is a functional anion corresponding to an anion of a conjugated acid having a  $pK_a$  less than 30, and is selected from the group consisting of:  $OH^-$ ,  $F^-$ ,  $R_cBZ_3^-$ ,  $N_3^-$ ,  $CN^-$ , and  $\bar{W}CR_cV$ ,

$Z$  is  $-F$ ,  $-OH$ , or an  $-OR$  group,  $R$  being an alkyl group comprising 1 to 20 carbon atoms,

$V$  and  $W$  are, independently of each other, an electroattractive group selected from the group consisting of a cyano, a alkoxycarbonyl moiety of 2 to 20 carbon atoms, acyl moiety of 2 to 20 carbon atoms, benzoyl, alkyl sulphonyl moiety of 1 to 20 carbon atoms, aryl sulphonyl moiety of 6 to 30 carbon atoms, and dialkoxyphosphonyl moiety of 2 to 20 carbon atoms, and



$R_c$  is selected from the group consisting of a branched, non-branched, cyclic or non-cyclic alkyl moiety of 1 to 20 carbon atoms and an aryl moiety of 6 to 30 carbon atoms.

124. (currently amended) A stable, homogeneous composition comprising:

an ionic liquid matrix of formula  $A_1^+X_1^-$  with non-functional ions, and,

a functionalized salt of formula  $A_2^+X_2^-$  with at least one functional ion,

~~said functionalized salt being dissolved in the ionic liquid matrix so that the composition forms a homogeneous phase, and~~

~~said functionalized salt participating in organic synthesis reactions by (i) that allows the catching of molecules,~~  
~~(ii) functionalizing functionalization of said molecules, and~~  
~~(iii) releasing release of said functionalized molecules after a reaction sequence, said functionalized salt being dissolved in the ionic liquid matrix so that the composition forms a homogeneous phase, wherein,~~

$A_1^+$  and  $A_2^+$  are substituted or non-substituted onium cations selected from the group consisting of pyridinium, imidazolium, ammonium, phosphonium or sulphonium cations, and,

$X_1^-$  and  $X_2^-$  anions are selected from the group

consisting of  $\text{BF}_4^-$ ,  $\text{PF}_6^-$ ,  $\text{CF}_3\text{SO}_3^-$ ,  $\text{CH}_3\text{COO}^-$ ,  $\text{CF}_3\text{CO}_2^-$ ,  $\text{N}(\text{SO}_2\text{CF}_3)_2^-$ , halides,  $\text{BR}_4^-$ ,  $\text{RCO}_2^-$  and  $\text{RSO}_3^-$  with R selected from the group consisting of an alkyl group of 1 to 20 carbon atoms, an aryl group of 6 to 30 carbon atoms, a perfluorinated or partially fluorinated group,  $\text{R}'\text{SO}_4^-$  with  $\text{R}'$  being selected from the group consisting of a hydrogen atom, a methyl group or an ethyl group, and complex anions resulting from the combination of a Lewis acid and a halide X of general formula  $\text{MX}_j$  with j being an integer between 1 and 7, X being a halide and M representing a metal selected from the group consisting of aluminum, tin, zinc, bismuth, manganese, iron, copper, molybdenum, antimony, gallium or indium,

said at least one functional ion is one of a functional cation of a formula is  $\text{Y}^+-\text{L}-\text{F}_i$  and a functional anion of a formula  $\text{Y}^{--}-(\text{L})_k-\text{F}_i$ ,

$\text{Y}^+$ - and  $\text{Y}^{--}$  are ionic entities that carry the charge of the cation and the charge of the anion, respectively,

L is an alkyl group of 1 to 20 carbon atoms,

$\text{F}_i$  is a function varying from  $\text{F}_0$  to  $\text{F}_n$ , and selected from the group consisting of hydroxyl, carboxylic, amide, sulphone, primary amine, secondary amine, aldehyde, ketone, ethenyl, ethynyl, dienyl, ether, epoxide, primary phosphine, secondary phosphine, tertiary phosphine, azide, imine, ketene, cumulene, heterocumulene, thiol, thioether, sulphoxide,

phosphorus-containing moieties, heterocycles, sulphonic acid, silane, stannane and functional aryl functions,

$F_0$  being a function initially linked to said ionic entities,

$n$  being an integer varying from 1 to 10 representing a number of reactions,

$F_1$  to  $F_{10}$  being functions converted from said  $F_0$  after sequential reactions with said ionic entities,

$k$  is equal to 0 or 1 and

$R$  is an alkyl group of 1 to 20 carbon atoms or an aryl group of 6 to 30 carbon atoms.

125. (currently amended) The composition according to claim 114, wherein,

$k=0$  such that  $Y^--(L)_k-F_i$  is  $Y^--F_i$ ,

$Y^--F_i$  ~~represents a single anion~~ is selected from the group consisting of  $OH^-$ ,  $F^-$ ,  $CN^-$ ,  $RO^-$  and  $RS^-$ , and

$R$  represents a 1 to 20 carbon atom alkyl group or 6 to 30 carbon atom aryl group.

126. (currently amended) The composition according to claim 124, wherein,

$k=0$  such that  $Y^--(L)_k-F_i$  is  $Y^--F_i$ ,

$Y^- - F_1$  ~~represents a single anion~~ is selected from the group consisting of  $OH^-$ ,  $F^-$ ,  $CN^-$ ,  $RO^-$  and  $RS^-$ , and

R represents a 1 to 20 carbon atom alkyl group or 6 to 30 carbon atom aryl group.